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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/826,274	04/04/2001	Joseph C. Olson	V0077/7154	2953

7590

09/12/2002

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EXAMINER

DONG, DALEI

ART UNIT

PAPER NUMBER

2875

DATE MAILED: 09/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/826,274

Applicant(s) *h*

OLSON ET AL.

Examiner

Dalei Dong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 April 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 14, 17 and 18 is/are rejected.
- 7) ☒ Claim(s) 10-13, 15 and 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claims 10-12, 15 and 16 are objected to because of the following informalities: preamble of the claims is in improper form. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
3. Claims 1-6, 8-11, 14, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,458,754 to Sathrum, in view of U.S. Patent No. 3,881,126 to Boots.

Regarding to claim 1, Sathrum discloses a vapor vacuum disposition chamber in Figure 1. According to Figure 1, component 15 represents "a source coating material, as the "cathode" for the vapor deposition process" (column 6, line 39-41). Sathrum also shows component 16 in Figure 1. which is "a cathode mounting apparatus" (column 6, line 63). However, Sathrum discloses a "high electrical current passing through the cathode during electric arc vapor deposition processes" (column 6, line 57-59), which is directly heating the cathode. Boots teaches, "a coiled heater is wrapped about core to

provide heating thereof" (column 2, line 36-37, also see Figure 1 for more detail). It would have been obvious to one of ordinary skill in the art to substitute the coiled heater of Boots in the place of directly heating or passing the current through the cathode of Sathrum for the purpose of enhancing the warm-up characteristics of the cathode and to improve ion source lifetime.

Regarding to claim 2, Sathrum shows all of the claimed limitations in claim 2. For instance, Sathrum shows a "support rod" that "typically has at least a portion thereof projecting outwardly through one of the chamber walls" (column 6, line 53-54).

Regarding to claim 3, Sathrum also shows all of the claimed limitations in claim 3. For example, Sathrum specify the physical shape of the "source material" can vary, for example, from cylindrical, to rectangular to irregular" (column 6, line 45-47). A flat cylindrical cathode is a form of a "disk".

Regarding to claim 4, Sathrum further shows all of the claimed limitations in claim 4. In figure 1, Sathrum shows the component 16, core support is fixedly attached to the center of the cathode.

Regarding to claim 5, Sathrum further shows all of the claimed limitations in claim 5. Figure 1, also shows a component 16, the core support in a cylindrical shape, and the diameter of component 15, the cathode is larger than the diameter of component 16, the core support.

Regarding to claim 6, Sathrum shows all of the claimed limitations in claim 6. Refer to Figure 1, component 15 the diameter of the cathode appears to be at least four times greater than the component 16 the diameter of the support component of the

cathode. Furthermore, applicant has not disclosed that having the diameter of the cathode at least four times greater than the diameter of the supporting rod to solve any stated problem.

Regarding to claim 8, Sathrum further yet discloses all of the claimed limitations in claim 8. Sathrum discloses the cathode is directly mounted on the core support (column 6, line 52). Sathrum also discloses "the power source is electrically connected to the cathode through the cathode mounting means" (column 7, line 5-6) or the "support rod." The mounting means of Sathrum functions as both a mechanical support and a electrical transfer tool for the cathode.

Regarding claim 9, Sathrum discloses all of the limitations in claim 9 with the teaching of Boots. Sathrum discloses, "a vapor vacuum deposition chamber having a first wall portion and a second wall portion appropriately connected together to form an enclosed inner cavity" (column 6, line 23-26). Sathrum also discloses an insulator or "appropriate vacuum seal, for maintaining the vacuum within the deposition cavity and for electrically isolating the cathode source from the deposition chamber wall portion" (column 6, line 64-67). However, Sathrum does not discloses an indirectly heated cathode ion source, and a filament for emitting electrons. Boots teaches, "a coiled heater is wrapped about core to provide heating thereof" (column 2, line 36-37, also see Figure 1 for more detail). It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the coiled heater of Boots in place of heating apparatus of Sathrum for the purpose of enhance the warm-up characteristics of cathode and to improve the lifetime of the ion source. Additionally, the coiled heater of Boots

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can be placed outside of the deposition chamber in close proximity to the support rod and the cathode assembly of Sathrum. Even though, the coiled heater does not emit electrons, however the filament and the coiled heater of Boots serves the same purpose and that is to heat up the cathode. Filament are old and well known for emitting electrons, hence, the coiled heater (filament) of Boots may be used as an electron emitter.

Regarding to claim 10, Sathrum with the teaching of Boots covers all of the claimed limitations in claim 10. Sathrum discloses a cathode with a supporting rod that is directly heated by applying current to the cathode through the supporting rod. However, Sathrum does not disclose filament disposed around the support rod. Boots teaches, "a coiled heater is wrapped about core to provide heating thereof" (column 2, line 36-37, also see Figure 1 for more detail). It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the heating filament of Boots to place around the core support rod of Sathrum in close proximity to the cathode and isolated from the deposition chamber, in order to enhance the warm-up characteristics of cathode and to improve the lifetime of the ion source.

Regarding to claim 11, Sathrum with the teaching of Boots discloses all of the claimed limitations in claim 11. Sathrum discloses a cathode with a supporting rod that is directly heated by applying current to the cathode through the supporting rod. However, Sathrum does not disclose filament disposed around the support rod and has a larger inner diameter than the support rod. Boots teaches, "a coiled heater is wrapped about core to provide heating thereof" (column 2, line 36-37, also see Figure 1 for more detail). In order for the coil or filament to wrap around the core support, the inner diameter of the

filament has to be greater than or equal to the diameter of the supporting core. It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the heating filament which has a greater or equal to the diameter of the core of Boots to place around the core support rod of Sathrum in close proximity to the cathode and isolated from the deposition chamber, in order to enhance the warm-up characteristics of cathode and to improve the lifetime of the ion source.

Regarding to claim 14, it is old and well known to the art to have vacuum gap between two objects in order to limit thermal conduction between two objects. Further the applicant has not established that the vacuum gap is critical to the invention and hence, the vacuum gap can be added in the design by routine experimentation by one having ordinary skill in the art.

Finally, regarding to claim 18, Sathrum with the teaching of Boots discloses all of the claimed limitations in claim 18. Sathrum discloses a cathode with a support rod fixedly attached to the center of the cathode and a cathode insulator that is electrically and thermally isolating the whole cathode apparatus from the deposition chamber. However, Sathrum does not disclose an mean for indirect heating of the cathode. Boots teaches, "a coiled heater is wrapped about core to provide heating thereof" (column 2, line 36-37, also see Figure 1 for more detail). It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the heating filament of Boots for the mean of indirect heating of the cathode of Sathrum for the purpose of enhance the warm-up characteristics of cathode and to improve the lifetime of the ion source.

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4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,458,754 to Sathrum, in view of U.S. Patent No. 3,881,126 to Boots, in further view of U.S. Patent No. 3,917,968 to Di Benedetto.

Sathrum discloses vapor vacuum disposition chamber, a cylindrical support rod fixedly attached to the cathode. Boots teaches, "a coiled heater is wrapped about core to provide heating thereof" (column 2, line 36-37, also see Figure 1 for more detail) to enhance the warm-up characteristics of cathode. Di Benedetto further teaches "thermionic filament for generating the electrons are mounted by means of resilient support mounts in the form of spring member" (column 1 line 68 – column 2 line 1-4). It would have been obvious to one of ordinary skill in the art to substitute the coiled heater of Boots in the place of directly heating or passing the current through the cathode of Sathrum to enhance the warm-up characteristics of cathode and to improve the lifetime of the ion source. Further yet, it would have also been obvious to one of ordinary skill in the art to substitute the support mount spring of Di Benedetto to hold the support rod of Sathrum and the coiled heater (filament) of Boots in order to secure and hold the support rod and the filament.

5. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,458,754 to Sathrum in view of U.S. Patent No. 3,983,443 to Schade.

Sathrum discloses a method for supporting the cathode of an ion source with a rod that is fixedly attached to the cathode, however, Sathrum fails to disclose an method of indirectly heating the cathode by bombarding the cathode with electrons. Schade teaches

"electrons from the directly heated auxiliary cathode bombard the other main cathode, thereby providing the required heating. It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the method of indirectly heating the cathode of Schade in place of the directly heating of Sathrum in order to improve the lifetime of the ion source.

Allowable Subject Matter

6. Claims 12, 13, 15 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art of record of Boots does not show a cross-sectional area of the filament varies along a length of the filament and is smallest along the arc-shaped turn.

The prior art of record of Sathrum does not show a cathode insulator-opening diameter that is larger than or equal to the diameter of the cathode.

The prior art of record of Sathrum does not show a cathode insulator of tubular shape includes a flange.

The prior art of record of Sathrum does not show a cathode insulator includes a flange where the flange contains a groove on a side of the flange.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of the art with respect to the ion implementer insulating material for the cathode.

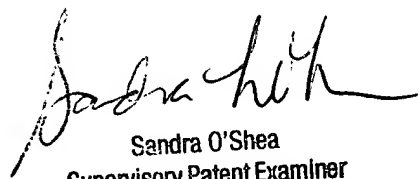
U.S. Patent No. 3,963,955 to Miram.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalei Dong whose telephone number is (703)308-2870. The examiner can normally be reached on 8 A.M. to 5 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (703)305-4939. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7722 for regular communications and (703)308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

D.D.
September 4, 2002


Sandra O'Shea
Supervisory Patent Examiner
Technology Center 2800